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March 11, 1963

TO: Computation Center Staff

FROM: M. J. Leslie Lowry, F. J. Corbató, J. R. Steinberg

SUBJECT: Memo, Modify, and Ditto Commands in the Compatible Time Sharing System.

INTRODUCTION

This memorandum describes a new facility which has been added to the MIT Compatible Time Sharing System (CTSS). A programmer may now use the IBM Selectric typewriter to edit a memorandum easily and create a master for reproduction without time-consuming retyping. Consecutive lines of the text are entered on the typewriter. When the whole memorandum has been entered, with appropriate control instructions, a finished copy will be typed, page by page, on the typewriter.

Control instruction to modify the format of the memorandum are each entered on control word lines. These are lines in the text which will not appear in the finished copy.

Each line is automatically given a number for easy referencing when changes are being made. This line number does not appear on the finished copy of the memorandum. The sequencing of the line numbers implies the order of their appearance in the finished memorandum.

Any line of text may be changed by typing another line using the same line number. Lines may be easily deleted using a control word line. Other control word lines allow the programmer to do the following:

1. Change all or part of the memorandum to double spacing.
2. Begin a new page.
3. Cause skipping of any number of lines.
4. Type in a header or title line which will automatically appear at the top of each page of the finished copy.
5. Insert footnotes anywhere in the memorandum and have them appear at the bottom of the correct page.
6. Easily modify several consecutive lines of the memorandum.

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CONTROL WORD DESCRIPTIONS:

1. .HEADER YYY...

The 48 characters YYY... will be printed at the top of each page of the memo. The statement "Page xx of yy" will automatically be inserted to complete this header (or title) line appropriately for each page. Pages will not be numbered unless this control word is used. Normally this control word line should only occur once in a memorandum.

2. .EDIT FROM LINE XX

This control word line is not entered into the memorandum file. MEMO and MODIFY automatically switch to printing the line numbers which have previously been entered, instead of the consecutively incremented line numbers. This printing starts with line XX. The programmer can thus replace a series of lines without worrying about omitting any. The sequence will be interrupted by a new .EDIT FROM LINE XX control word or by the .END EDIT control word.

3. .END EDIT

This control word line, which is not entered into the memo file, causes the resumption of typing of new line numbers.

4. .END MEMO

The lines which have been entered will be filed in the user's file with the title given by the initial request for MEMO or MODIFY.

5. .DELETE LINE XX

The line XX will be deleted, and no line will be entered into the memo file for this control word line.

6. .RESEQUENCE LINE NUMBERS

All the lines of the memorandum are assigned sequential line numbers starting with 000100 and incrementing by 100's. A copy of the text (with line numbers) is printed when this process is complete. This control word facilitates additional correction and editing of texts which may have had excessive corrections and insertions. The .END MEMO control word is then assumed and the memorandum is filed as explained in description 4.

7. .COMMENT

The lines of text which follow this control word line are considered to be notes or comments to the programmer. The .COMMENT control word line will not appear in the finished copy of the memorandum. The lines of notes following it will be printed on an initial page of the finished copy. These comments are exerpted and printed at the beginning of the memorandum in spite of the fact that they had line sequence numbers implying their position to be later. The signal to MEMO and MODIFY that the comments are done is the .END COMMENT control word line. Other control word lines will not be recognized between .COMMENT and .END COMMENT.

TABLE 1

CONTROL WORDS

Fixed Format	Variable Portion	Brief Mode Equivalent
.EDIT FROM LINE XX		.ED XX
.END EDIT		.EE
.END MEMO		.EM
.DELETE LINE XX		.DE XX
.RESEQUENCE LINE NUMBERS		.RE
.COMMENT		.CO
.END COMMENT		.EC
.HEADER YYY...		.HE YYY...
.BEGIN PAGE		.BE
.FOOTNOTE IN LINE XX AFTER/YYY.../		.FO XX/YYY.../
.DOUBLE SPACE		.DO
.SINGLE SPACE		.SI
.SPACE XX		.SP XX
.CHANGE TYPE BALL TO XX		.CH XX
.END FOOTNOTE		.EF

A control word is indicated by a leading period which is the first entry after a line number. A control word is recognized by the first six characters after the period. In control words requiring the recognition of a number or special set of characters, the remainder of the line is scanned from left to right until the number or special set of characters is found.

For ease in entering the control words a brief mode of operation will be allowed. Instead of matching a 6-character control word after the period, MEMO and MODIFY will accept the two-letter codes listed in Table 1. The scan for numerics or special characters is then begun, if applicable.

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2. .EDIT FROM LINE XX

This control word line is not entered into the memorandum file. MEMO and MODIFY automatically switch to printing the line numbers which have previously been entered, instead of the consecutively incremented line numbers. This printing starts with line XX. The programmer can thus replace a series of lines without worrying about omitting any. The sequence will be interrupted by a new .EDIT FROM LINE XX control word or by the .END EDIT control word.

3. .END EDIT

This control word line, which is not entered into the memo file, causes the resumption of typing of new line numbers.

4. .END MEMO

The lines which have been entered will be filed in the user's file with the title given by the initial request for MEMO or MODIFY.

5. .DELETE LINE XX

The line XX will be deleted, and no line will be entered into the memo file for this control word line.

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All the lines of the memorandum are assigned sequential line numbers starting with 000100 and incrementing by 100's. A copy of the text (with line numbers) is printed when this process is complete. This control word facilitates additional correction and editing of texts which may have had excessive corrections and insertions. The .END MEMO control word is then assumed and the memorandum is filed as explained in description 4.

7. .COMMENT

The lines of text which follow this control word line are considered to be notes or comments to the programmer. The .COMMENT control word line will not appear in the finished copy of the memorandum. The lines of notes following it will be printed on an initial page of the finished copy. These comments are exerpted and printed at the beginning of the memorandum in spite of the fact that they had line sequence numbers implying their position to be later. The signal to MEMO and MODIFY that the comments are done is the .END COMMENT control word line. Other control word lines will not be recognized between .COMMENT and .END COMMENT.

8. .END COMMENT

This control word is the only means of indicating the end of a sequence of messages to the operator.

9. .BEGIN PAGE

The line following this control word will be positioned at the beginning of a page, (after a heading line, if present.)

10. .FOOTNOTE IN LINE XX AFTER /YYY.../

The lines following this control word are considered the body of the footnote. The footnote is terminated by the .END FOOTNOTE control word or another .FOOTNOTE control word. The exact sequence of characters YYY... is found in line number XX and a footnote reference number is inserted in parentheses immediately following. Three or four blanks should be left in the correct position in line XX to permit this insertion without any overlapping. The body of the footnote will appear at the foot of the page containing line XX. Large footnotes may be extended to the next page.

11. .DOUBLE SPACE

A blank line will be inserted after each subsequent line of the memorandum.

12. .SINGLE SPACE

This control word causes a change in mode from double spacing to single spacing.

13. .SPACE XX

XX blank lines will be skipped before the next line of text is printed by the DITTO programme.

14. .CHANGE TYPE BALL TO XX

This control word, useful only for the IBM Selectric typewriter implies the intention to print one or more characters of the preceeding line using a different type ball. When the finished form of the memorandum is to be typed by DITTO, a set of instructions to the operator will be printed on a preliminary page. This is illustrated in the example below. As described there, a stop occurs after the affected line. The carriage should then be manually rotated back 2 lines. When the carriage return is struck, the printing of the line will continue, assuming the type ball has been changed. It can be seen that blanks must be inserted carefully in the lines preceeding the control word line and following the control word line to prevent over printing.

When typing with a non BCD character set extra care must be taken not to strike the period position on the keyboard at the beginning of a line unless a control word line is intended.

The same may be continued using the new type ball until a change type ball control word is recognized.

13. .END FOOTNOTE

See the description of control word 10.

EXAMPLE:

The following is an example of the use of the commands to prepare a short memorandum.

```
login|m1416|1966
WAIT,
M1416|1966  LOGGED IN 2/10  1135.7
READY.
memo|CC320|memo
000/00   .header  New Commands for CTSS.
000200   .space 40
000300   This memorandum has been prepared by M.J.L. Lowry.
000400   Distribution:  F. J. Corbató
000500                  J. R. Steinberg
000600                  R. J. Creasy
000700   .begin page
000800   Section I:
000900       Three new commands have been added to the
001000   MIT CTSS.  These are MEMO, MODIFY and DITTO.
001100   These commands provide a fast, easy way to
001200   manipulate and duplicate textual matter.
001300       Textual material is entered via the on-
001400
001250   They can be used consecutively or individually.

001500   line typewriter, manipulated in part automatically
001600   and in part by means of control words.
001700   .Edit from line 400
000400   Limited distribution, as follows:  F. J. Corbató
000500                                      J. R. Steinberg
000600                                      R. J. Creasy
```

```
000700  .End edit
001700  .Begin page
001800  Section II:
001900      If it is necessary to type a special character
002000  using a different type ball, the following procedure
002100  is used.  The line with the special character, for
002200  example  , is typed leaving a blank.
002300  .change type ball to Greek
002400          α
002500  .change type ball to Roman
002600
002700      The ball was changed to Greek to type line 2400
002800  and then restored for the next line.  In the finished
002900  copy both line 2400 and line 2600 will be typed
003000  on top of line 2200.  It is also possible to use
003200  more than one type ball change per line.  If line
003300  2500 requested a change to ball X, any special
003400  characters typed into line 2600 by ball X would also
003500  be inserted in line 2200.
003600  .Space 7
003700  Section III:
003800      To conclude the memo one uses a control
003900  word which will file the text in a form ready for access
004000  by the DITTO program.
004100  .End memo
READY.
ditto|CC320|memo
Type request for single form or continuous form paper.
single form
```

```
000700    .End edit
001700    .Begin page
001800    Section II:
001900        If it is necessary to type a special character,
002000    using a different type ball, the following procedure
002100    is used.  The line with the special character, for
002200    example  , is typed leaving a blank.
002300    .change type ball to Greek
002400              α
002500    .change type ball to Roman
002600
002700        The ball was changed to Greek to type line 2400,
002800    and then restored for the next line.  In the finished
002900    copy both line 2400 and line 2600 will be typed
003000    on top of line 2200.  It is also possible to use
003100    more than one type ball change per line.  If line
003300    2500 requested a change to ball X, any special
003400    characters typed into line 2600 by ball X would also
003500    be inserted in line 2200.
003600    .Space 7
003700    Section III:
003800        To conclude the memo one uses a control
003900    word which will file the text in a form ready for access
004000    by the DITTO program.
004100    .End memo
READY.
ditto|CC320|memo
Type request for single form or continuous form paper.
single form
```

At the first stop on page 3, change type ball to Greek,
turn carriage back 2 turns and strike a carriage return.
At the next stop on page 3, change type ball to Roman,
turn carriage back 2 turns and strike a carriage return
At final stop on each page load paper for next page and
strike carriage return to continue typing.
There are 3 pages in this memo.
When this message ends load paper and hit return to begin.

This memorandum has been prepared by M.J.L. Lewry.

Limited distribution, as follows: F.J. Corbató
J.R. Steinberg
R.J. Creasy

SECTION I.

Three new commands have been added to the MIT CTSS. These are MEMO, MODIFY and DITTO. These commands provide a fast, easy way to manipulate and duplicate textual matter. They can be used consecutively or individually.

Textual material is entered via the on-line typewriter, manipulated in part automatically and in part by means of control words.

SECTION II:

If it is necessary to type a special character using a different type ball, the following procedure is used. The line with the special character, for example α, is typed leaving a blank.

The ball was changed to Greek to type line 2400 and then restored for the next line. In the finished copy both line 2400 and line 2600 will be typed on top of line 2200. It is also possible to use more than one type ball change per line. If line 2500 requested a change to ball X, any special characters typed into line 2600 by ball X would also be inserted in line 3200.

SECTION III:

To conclude the memo one uses a control word which will file the text in a form ready for access by the DITTO program.